control means included in said actuator for controlling the actuator based on the amount of torque detected by said torque detection means.

Claim 2 has been canceled.

Please amend Claim 3 as follows:

3. (Amended) The joint control apparatus according to Claim 1, wherein the actuator includes:

a motor unit that generates the torque depending on a supplied drive current;

a torque amplification unit that amplifies the torque generated by said motor unit, and transmits the torque to the actuator; and

motor control means included in said motor unit for controlling said motor unit by supplying said motor unit with a level of drive current based on externally provided control information.

Please amend Claim 4 as follows:

4. (Amended) A joint control method for controlling the movement of a robot joint in which the joint includes a first link and a second link where the first link is rotated about a predetermined axis with torque generated by the apparatus, said method including:

a first step of detecting a drive current of the actuator using an electric current detection means included in the actuator;

a second step of detecting an amount of torque based on the drive current detected by the electric current detection means using torque detection means included in the actuator; and

a third step of controlling the actuator using control means based on the amount of torque detected in said second step.

Claim 5 has been canceled.

Please amend Claim 6 as follows:

6. (Amended) A robot device including a joint control apparatus for controlling the movement of the joint, which includes a first link and a second link where the first link is rotated about a predetermined axis with torque generated by the apparatus, said apparatus comprising:

an actuator;

electric current detection means included in said actuator for detecting a drive current of the actuator;

torque detection means included in said actuator for detecting the amount of torque based on the drive current detected by said electric current detection means; and

control means included in said actuator for controlling the actuator based on the amount of torque detected by said torque detection means.

Claim 7 has been canceled.

Please amend Claim 8 as follows:

8. (Amended) The robot device according to Claim 6, wherein the actuator includes:

a motor unit that generates the torque depending on a supplied drive current;

a torque amplification unit that amplifies the torque generated by said motor unit, and transmits the torque to the actuator; and

motor control means included in said motor unit for controlling said motor unit by supplying said motor unit with a level of drive current based on externally provided control information.

Please amend Claim 9 as follows:

9. (Amended) A robot device control method having a joint mechanism for controlling the movement of a the joint, which includes a first component and a second component where the first component is rotated about a predetermined axis with torque that is output from the actuator through an output axis of the actuator, comprising:

a first step of detecting an electric current value of the drive current of the actuator using electric current detection means included in the actuator;

a second step of detecting a level of a torque created by an external force applied to the output axis of the actuator based on the detected electric current value using control means included in said actuator; and

a third step of controlling the actuator using control means included in said actuator such that the torque created by the external force applied to the output axis of the actuator can be removed based on a detected result obtained in said second step.

Claim 10 has been canceled.

11. (Amended) A robot device having a pair of leg units in each of which a lower leg unit is connected to a thigh unit through a knee joint mechanism, and a foot unit connected to the lower leg unit through an ankle joint mechanism, said pair of leg units being driven in a predetermined pattern such that a walking operation is performed wherein said foot units of said leg units alternately touch a walking path on which the robot device is placed said robot device comprising :

an actuator, provided in said ankle joint mechanism, generating a rotation torque whose level depends on a drive current for rotation-driving said foot unit on a predetermined axis;

electric current detection means included in said actuator for detecting an electric current value of the drive current of the actuator;

torque detection means included in said actuator for detecting a level of torque created by an external force applied to the output axis of the actuator based on the electric current value detected by said electric current detection means; and

control means included in said actuator for controlling the actuator based on a detection result from said torque detection means such that the external force applied to the output axis of the actuator can be removed.

Please amend Claim 12 as follows:

12. (Amended) The robot device according to Claim 11, said actuator comprising:

a motor unit generating the rotation torque depending on a supplied drive current;

a torque amplification unit amplifying the rotation torque generated by said motor unit, and transmitting the torque to said output axis; and

motor control means included in said motor unit for controlling said motor unit by supplying said motor unit with the drive current at a level according to externally provided control information.

Please amend Claim 13 as follows:

13. (Amended) A method of controlling a robot device having a pair of leg units in which a lower leg unit is connected to a thigh unit through a knee joint mechanism, and a foot unit is connected to the lower leg unit through an ankle joint mechanism, said pair of leg units being driven in a predetermined pattern such that a walking operation is performed wherein said foot units of said leg units alternately touch a walking path one which the robot device is placed, said method comprising:

a first step of detecting an electric current value of the drive current using electric current detection means included in an actuator in said ankle joint mechanism, and generating a rotation torque whose level depends on a drive current for rotation-driving said foot unit on a predetermined axis;

a second step of detecting an externally applied torque using external torque detection means included in said actuator, where said external torque is determined by creating an external force applied to the output axis of the actuator based on the detected electric current value; and

a third step of controlling the actuator using control means included in said actuator, based on a detection result obtained in said second step, such that the external force applied to the output axis of the actuator can be counteracted.

Please amend Claim 14 as follows:

14. (Amended) A joint device in which a first link connected to a second link is freely rotatable about a predetermined axis, the joint device comprising

an actuator generating rotation torque for rotation-driving said first link about said predetermined axis,

said actuator comprises:

a motor unit generating the rotation torque; and

motor control means included in said motor unit for controlling the rotation torque output from said motor unit.

Please amend Claim 16 as follows:

16. (Amended) A robot device having a joint mechanism in which a first component is connected to a second component in a freely rotating manner about on a predetermined axis, and

an actuator generating a rotation torque for rotation-driving said first component about the predetermined axis, said actuator comprising:

a motor unit generating the rotation torque; and

motor control means included in said motor unit for controlling the rotation torque output from said motor unit.

Please add new Claim 18 as follows:

18. (New) A control apparatus for controlling a joint mechanism comprising:

a first link;

a second link connected to said first link being capable of rotating around a predetermined axis;

a motor for rotating said first link around said predetermined axis on the basis of a rotation torque output through an output axis of the motor; and

control means for controlling said joint mechanism;

wherein

said motor has a motor case that includes a rotation axis, drive means for driving said rotation axis, electric current detection means for detecting an electric current value of the drive current of the motor, and external force torque detection means for detecting a torque applied to the output axis of the motor based on the electric current value detected by the electric current detection means in said motor case, and wherein

said control means controls said joint mechanism based on said external force torque detected by said external force torque detection means.

Please add new Claim 19 as follows:

19. (New) A robot apparatus including a joint mechanism comprising:

a first link;

a second link connected to said first link being capable of rotating around a predetermined axis;

a motor for rotating said first link around said predetermined axis on the basis of a rotation torque output through an output axis of the motor; and

control means for controlling said joint mechanism;

wherein

said motor has a motor case that includes a rotation axis, drive means for driving said rotation axis, electric current detection means for detecting an electric current value of the drive current of the motor, and external force torque detection means for detecting a torque applied to the output axis of the motor based on the electric current value detected by the electric current detection means in said motor case, and wherein

said control means controls said joint mechanism based on said external force torque detected by said external force torque detection means.

Please add new Claim 20 as follows:

20. (New) A robot apparatus having a plurality of joint mechanisms driven by an actuator comprising:

a memory for storing a plurality of values of self-weight (tare) torque which are applied to each joint at the time of each posture;

means for calculating an output torque which drives each of said joints;

means for calculating an external force torque applied to said joint by subtracting said self-weight (tare) torque from said output torque; and

control means for controlling said joint mechanism according to said external force torque.

Please add new Claim 21 as follows:

21. (New) The robot apparatus of Claim 20, wherein said actuator includes:

electric current detection means for detecting an electric current value of the drive current of the actuator; and

external force torque detection means for detecting a level of torque by an external force applied to the output axis of the actuator based on the electric current value detected by said electric current detection means.

Please add new Claim 22 as follows:

22. (New) A robot apparatus including a joint mechanism comprising:

a first link;

a second link connected to said first link being capable of rotating around a predeterminated axis;

a motor for rotating said first link around said predetermined axis on the basis of a rotation torque output through an output axis of the motor; and

control means for controlling said joint mechanism; and wherein:

said motor has a motor case that includes servo control means for controlling the motor rotation by a servo system; and

said control means controls said joint mechanism based on said servo control by said serve control means.